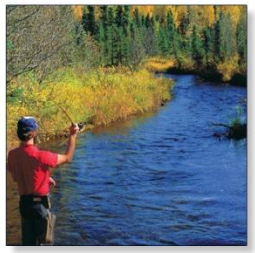
ESPAM2.1 Depletion Factors (AKA Response Functions)

Allan Wylie IDWR

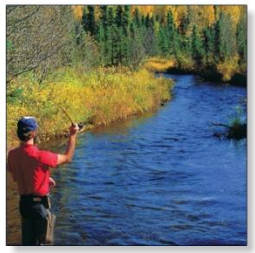
6 May, 2014

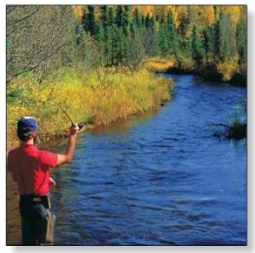
Outline

- Why a transient depletion factor database
  - Response function = depletion factor
- Development of the database
- Distribution of the database
- How IDWR intends to use the database
- How to obtain the database

Why a transient depletion factor database

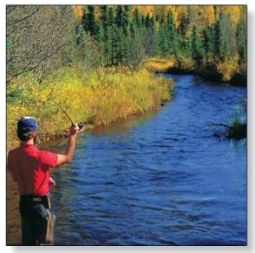


- The Idaho Water Resource Board (IWRB) received funding to support aquifer enhancement activities.
- Several requests from the IWRB for analyses that could be conducted using a transient depletion factor database.

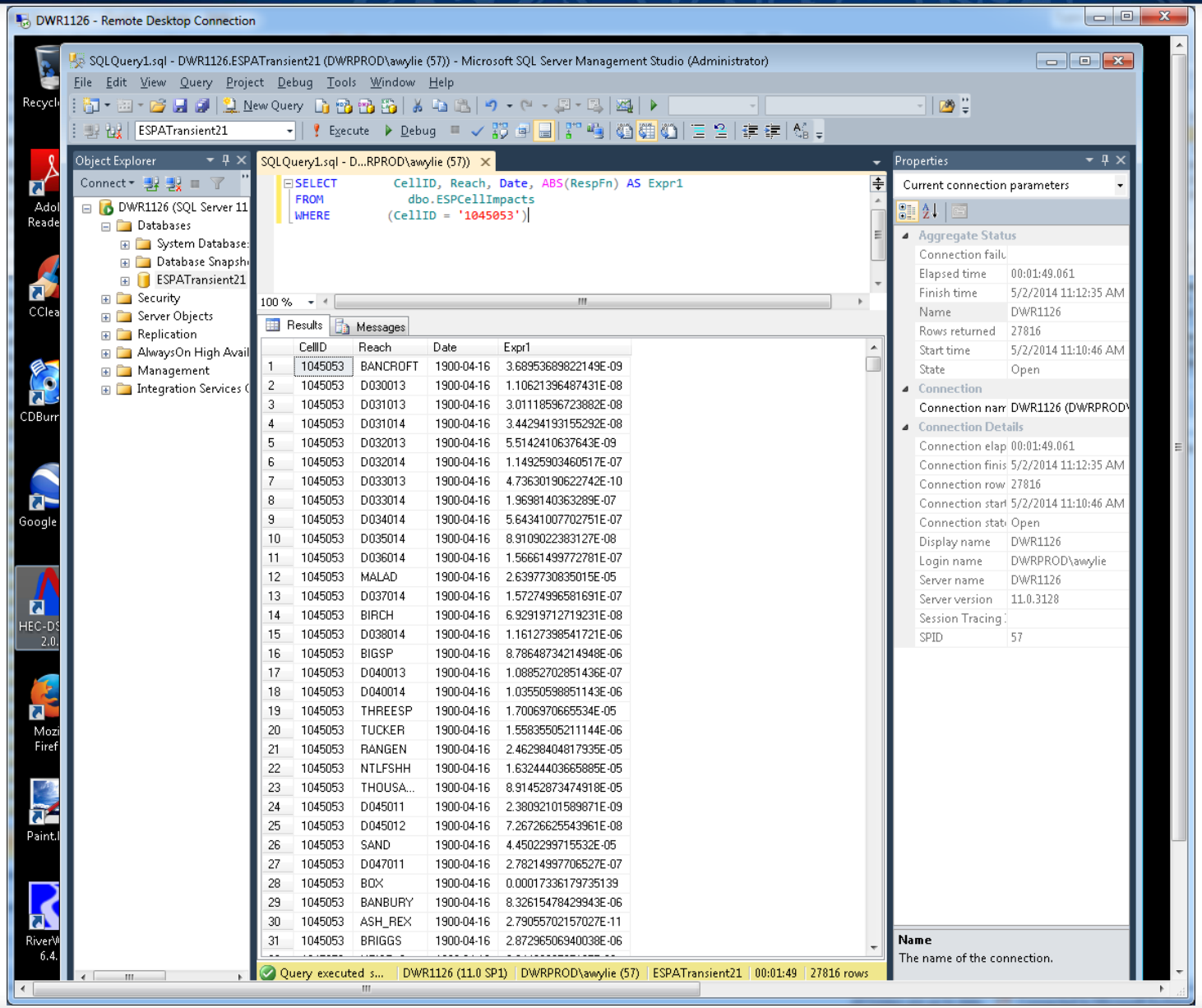
Development of the database

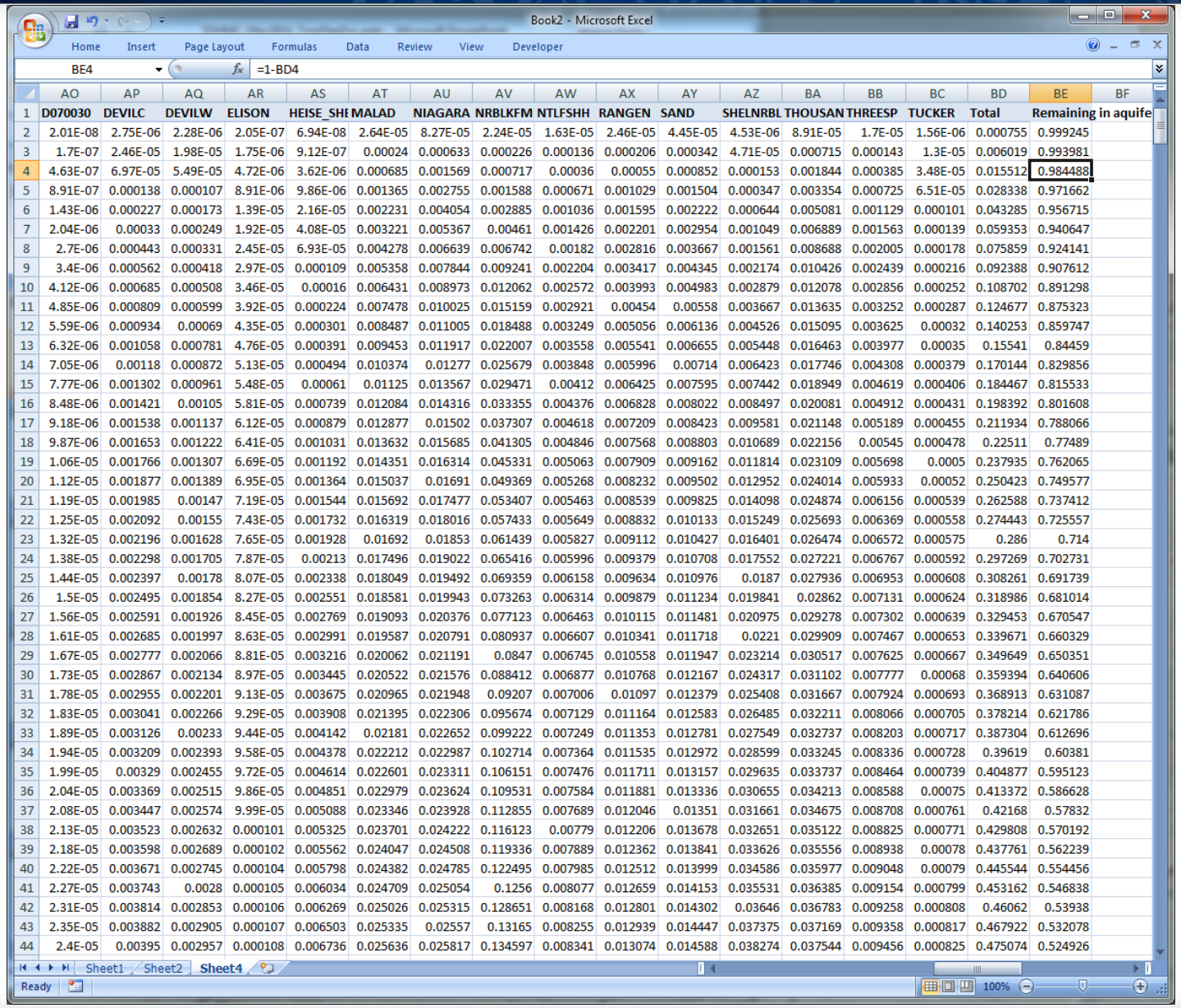
- Transient depletion factors
  - Calculated for every active model cell
    - 1st stress period=30 day injection of 1.2 cfs
    - 2nd stress period=40 yr of no injection
      - 487 30 day time steps
    - Calculate fraction of injected volume exiting aquifer for each reach at each time step
    - 799 MB in zipped text files, 12.2 GB in database
- Steady state and transient depletion factors are on the ESHMC web page
  - http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.1_Current/

Use of database

- Evaluation of potential Water Board Sponsored recharge sites
  - Produce depletion factors for individual model cells
  - Produce charts sowing fate of water at specific time after injection
  - Produce maps showing depletion factor at specific times


DWR1126 - Remote Desktop Connection
SQLQuery1.sql - DWR1126.ESPATransient21 (DWRPROD\awylie (57)) - Microsoft SQL Server Management Studio (Administrator)
File Edit View Query Project Debug Tools Window Help
New Query
ESPATransient21
Execute Debug
Object Explorer
Connect
DWR1126 (SQL Server 11
Databases
System Databases
Database Snapsh
ESPATransient21
Security
Server Objects
Replication
AlwaysOn High Avail
Management
Integration Services
SQLQuery1.sql - D...RPROD\awylie (57))
SELECT CellID, Reach, Date, ABS(RespFn) AS Expr1
FROM dbo.ESPCellImpacts
WHERE (CellID = '1045053')
100 %
Results
Messages
CellID Reach Date Expr1
1 1045053 BANCROFT 1900-04-16 3.68953689822149E-09
2 1045053 D030013 1900-04-16 1.10621396487431E-08
3 1045053 D031013 1900-04-16 3.011185967238 82E-08
4 1045053 D031014 1900-04-16 3.442941931552 92E-08
5 1045053 D032013 1900-04-16 5.5142410637643E-09
6 1045053 D032014 1900-04-16 1.14925903460517E-07
7 1045053 D033013 1900-04-16 4.73630190622742E-10
8 1045053 D033014 1900-04-16 1.9698140363289E-07
9 1045053 D034014 1900-04-16 5.643410077027 51E-07
10 1045053 D035014 1900-04-16 8.9109022383127E-08
11 1045053 D036014 1900-04-16 1.56661499772781E-07
12 1045053 MALAD 1900-04-16 2.6397730835015E-05
13 1045053 D037014 1900-04-16 1.57274996581691E-07
14 1045053 BIRCH 1900-04-16 6.92919712719231E-08
15 1045053 D038014 1900-04-16 1.16127398541721E-06
16 1045053 BIGSP 1900-04-16 8.78648734214948E-06
17 1045053 D040013 1900-04-16 1.08852702851436E-07
18 1045053 D040014 1900-04-16 1.03550598851143E-06
19 1045053 THREESP 1900-04-16 1.7006970665534E-05
20 1045053 TUCKER 1900-04-16 1.55835505211144E-06
21 1045053 RANGEN 1900-04-16 2.462984048179 35E-05
22 1045053 NTLFSHH 1900-04-16 1.63244403665885E-05
23 1045053 THOUSA... 1900-04-16 8.914528734749 18E-05
24 1045053 D045011 1900-04-16 2.38092101589871E-09
25 1045053 D045012 1900-04-16 7.26726625543961E-08
26 1045053 SAND 1900-04-16 4.4502299715532E-05
27 1045053 D047011 1900-04-16 2.78214997706527E-07
28 1045053 BOX 1900-04-16 0.00017336179735139
29 1045053 BANBURY 1900-04-16 8.326154784299 43E-06
30 1045053 ASH_REX 1900-04-16 2.790557021570 27E-11
31 1045053 BRIGGS 1900-04-16 2.872965069400 38E-06
Query executed s... DWR1126 (11.0 SP1) DWRPROD\awylie (57) ESPATransient21 00:01:49 27816 rows
Properties
Current connection parameters
Aggregate Status
Connection failu
Elapsed time 00:01:49.061
Finish time 5/2/2014 11:12:35 AM
Name DWR1126
Rows returned 27816
Start time 5/2/2014 11:10:46 AM
State Open
Connection
Connection nam DWR1126 (DWRPROD
Connection Details
Connection elap 00:01:49.061
Connection finis 5/2/2014 11:12:35 AM
Connection row 27816
Connection start 5/2/2014 11:10:46 AM
Connection stat Open
Display name DWR1126
Login name DWRPROD\awylie
Server name DWR1126
Server version 11.0.3128
Session Tracing
SPID 57
Name
The name of the connection.



Book2 - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Developer

BE4 =1-BD4

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1	D070030	DEVILC	DEVILW	ELISON	HEISE_SHI	MALAD	NIAGARA	NRBLKFM	NTLFSHH	RANGEN	SAND	SHELNRBL	THOUSAN	THREESP	TUCKER	Total	Remaining in aquife	
2	2.01E-08	2.75E-06	2.28E-06	2.05E-07	6.94E-08	2.64E-05	8.27E-05	2.24E-05	1.63E-05	2.46E-05	4.45E-05	4.53E-06	8.91E-05	1.7E-05	1.56E-06	0.000755	0.999245	
3	1.7E-07	2.46E-05	1.98E-05	1.75E-06	9.12E-07	0.00024	0.000633	0.000226	0.000136	0.000206	0.000342	4.71E-05	0.000715	0.000143	1.3E-05	0.006019	0.993981	
4	4.63E-07	6.97E-05	5.49E-05	4.72E-06	3.62E-06	0.000685	0.001569	0.000717	0.00036	0.00055	0.000852	0.000153	0.001844	0.000385	3.48E-05	0.015512	0.984488	
5	8.91E-07	0.000138	0.000107	8.91E-06	9.86E-06	0.001365	0.002755	0.001588	0.000671	0.001029	0.001504	0.000347	0.003354	0.000725	6.51E-05	0.028338	0.971662	
6	1.43E-06	0.000227	0.000173	1.39E-05	2.16E-05	0.002231	0.004054	0.002885	0.001036	0.001595	0.002222	0.000644	0.005081	0.001129	0.000101	0.043285	0.956715	
7	2.04E-06	0.00033	0.000249	1.92E-05	4.08E-05	0.003221	0.005367	0.00461	0.001426	0.002201	0.002954	0.001049	0.006889	0.001563	0.000139	0.059353	0.940647	
8	2.7E-06	0.000443	0.000331	2.45E-05	6.93E-05	0.004278	0.006639	0.006742	0.00182	0.002816	0.003667	0.001561	0.008688	0.002005	0.000178	0.075859	0.924141	
9	3.4E-06	0.000562	0.000418	2.97E-05	0.000109	0.005358	0.007844	0.009241	0.002204	0.003417	0.004345	0.002174	0.010426	0.002439	0.000216	0.092388	0.907612	
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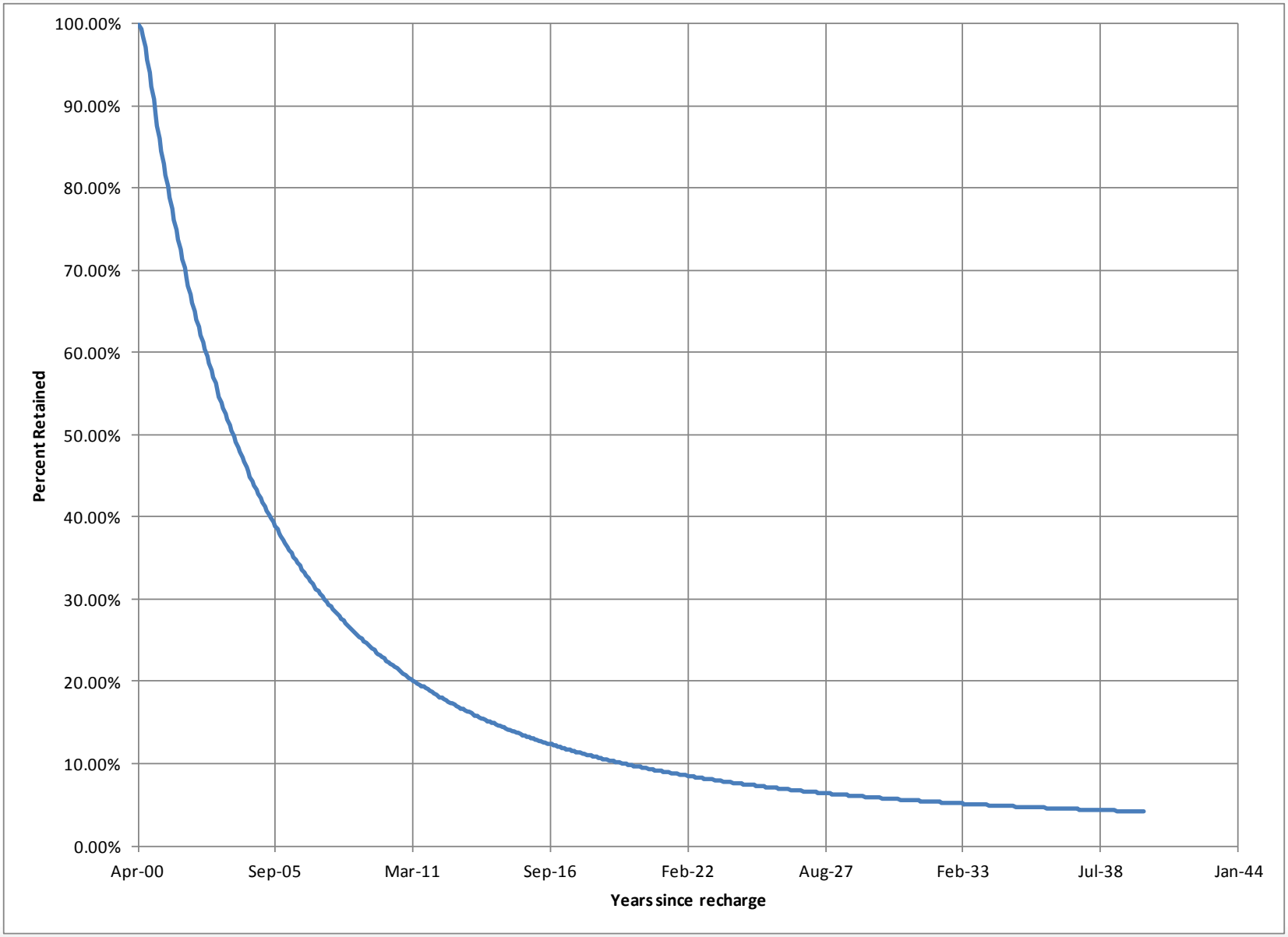
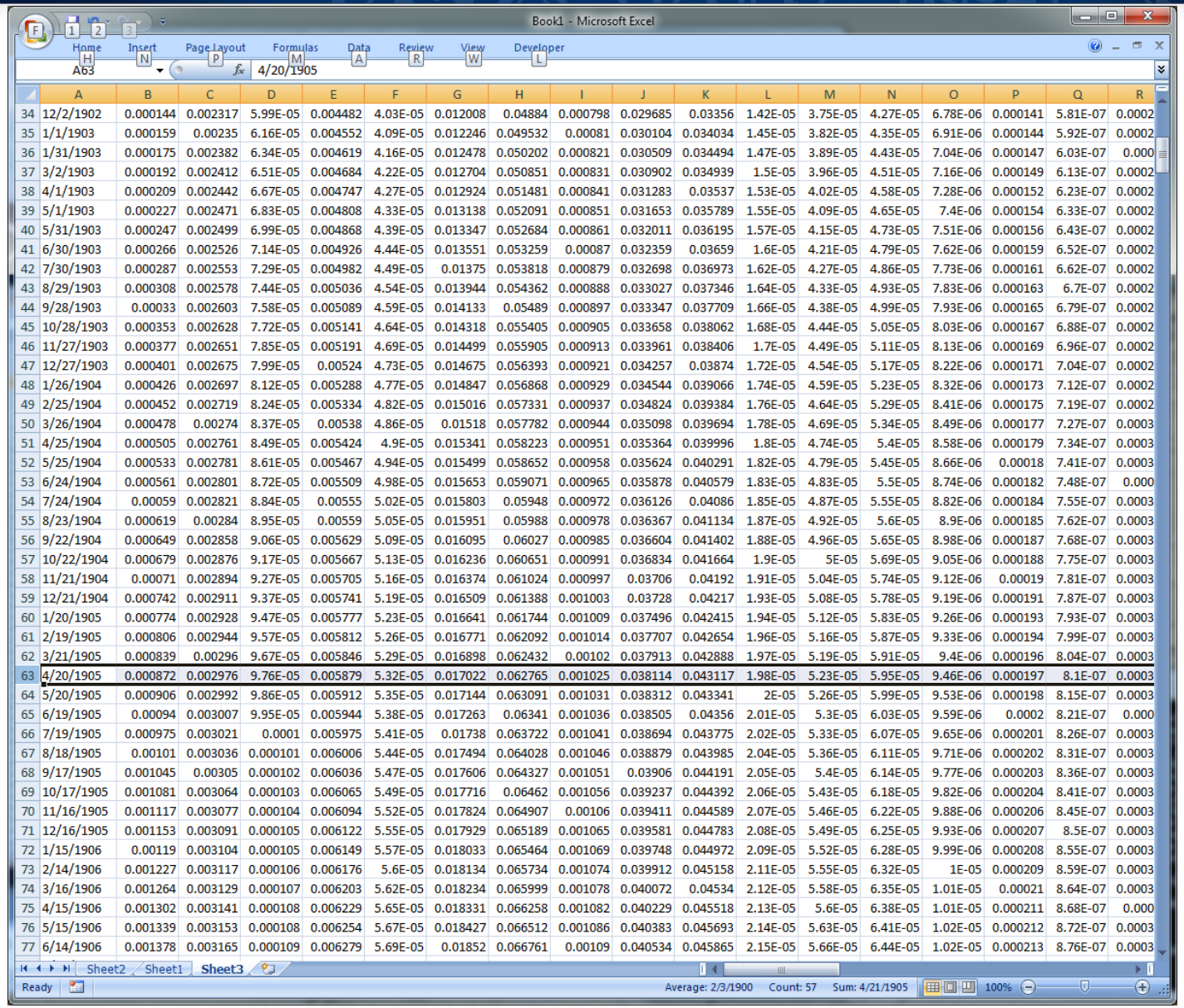
11	4.85E-06	0.000809	0.000599	3.92E-05	0.000224	0.007478	0.010025	0.015159	0.002921	0.00454	0.00558	0.003667	0.013635	0.003252	0.000287	0.124677	0.875323	
12	5.59E-06	0.000934	0.00069	4.35E-05	0.000301	0.008487	0.011005	0.018488	0.003249	0.005056	0.006136	0.004526	0.015095	0.003625	0.00032	0.140253	0.859747	
13	6.32E-06	0.001058	0.000781	4.76E-05	0.000391	0.009453	0.011917	0.022007	0.003558	0.005541	0.006655	0.005448	0.016463	0.003977	0.00035	0.15541	0.84459	
14	7.05E-06	0.00118	0.000872	5.13E-05	0.000494	0.010374	0.01277	0.025679	0.003848	0.005996	0.00714	0.006423	0.017746	0.004308	0.000379	0.170144	0.829856	
15	7.77E-06	0.001302	0.000961	5.48E-05	0.00061	0.01125	0.013567	0.029471	0.00412	0.006425	0.007595	0.007442	0.018949	0.004619	0.000406	0.184467	0.815533	
16	8.48E-06	0.001421	0.00105	5.81E-05	0.000739	0.012084	0.014316	0.033355	0.004376	0.006828	0.008022	0.008497	0.020081	0.004912	0.000431	0.198392	0.801608	
17	9.18E-06	0.001538	0.001137	6.12E-05	0.000879	0.012877	0.01502	0.037307	0.004618	0.007209	0.008423	0.009581	0.021148	0.005189	0.000455	0.211934	0.788066	
18	9.87E-06	0.001653	0.001222	6.41E-05	0.001031	0.013632	0.015685	0.041305	0.004846	0.007568	0.008803	0.010689	0.022156	0.00545	0.000478	0.22511	0.77489	
19	1.06E-05	0.001766	0.001307	6.69E-05	0.001192	0.014351	0.016314	0.045331	0.005063	0.007909	0.009162	0.011814	0.023109	0.005698	0.0005	0.237935	0.762065	
20	1.12E-05	0.001877	0.001389	6.95E-05	0.001364	0.015037	0.01691	0.049369	0.005268	0.008232	0.009502	0.012952	0.024014	0.005933	0.00052	0.250423	0.749577	
21	1.19E-05	0.001985	0.00147	7.19E-05	0.001544	0.015692	0.017477	0.053407	0.005463	0.008539	0.009825	0.014098	0.024874	0.006156	0.000539	0.262588	0.737412	
22	1.25E-05	0.002092	0.00155	7.43E-05	0.001732	0.016319	0.018016	0.057433	0.005649	0.008832	0.010133	0.015249	0.025693	0.006369	0.000558	0.274443	0.725557	
23	1.32E-05	0.002196	0.001628	7.65E-05	0.001928	0.01692	0.01853	0.061439	0.005827	0.009112	0.010427	0.016401	0.026474	0.006572	0.000575	0.286	0.714	
24	1.38E-05	0.002298	0.001705	7.87E-05	0.00213	0.017496	0.019022	0.065416	0.005996	0.009379	0.010708	0.017552	0.027221	0.006767	0.000592	0.297269	0.702731	
25	1.44E-05	0.002397	0.00178	8.07E-05	0.002338	0.018049	0.019492	0.069359	0.006158	0.009634	0.010976	0.0187	0.027936	0.006953	0.000608	0.308261	0.691739	
26	1.5E-05	0.002495	0.001854	8.27E-05	0.002551	0.018581	0.019943	0.073263	0.006314	0.009879	0.011234	0.019841	0.02862	0.007131	0.000624	0.318986	0.681014	
27	1.56E-05	0.002591	0.001926	8.45E-05	0.002769	0.019093	0.020376	0.077123	0.006463	0.010115	0.011481	0.020975	0.029278	0.007302	0.000639	0.329453	0.670547	
28	1.61E-05	0.002685	0.001997	8.63E-05	0.002991	0.019587	0.020791	0.080937	0.006607	0.010341	0.011718	0.0221	0.029909	0.007467	0.000653	0.339671	0.660329	
29	1.67E-05	0.002777	0.002066	8.81E-05	0.003216	0.020062	0.021191	0.0847	0.006745	0.010558	0.011947	0.023214	0.030517	0.007625	0.000667	0.349649	0.650351	
30	1.73E-05	0.002867	0.002134	8.97E-05	0.003445	0.020522	0.021576	0.088412	0.006877	0.010768	0.012167	0.024317	0.031102	0.007777	0.00068	0.359394	0.640606	
31	1.78E-05	0.002955	0.002201	9.13E-05	0.003675	0.020965	0.021948	0.09207	0.007006	0.01097	0.012379	0.025408	0.031667	0.007924	0.000693	0.368913	0.631087	
32	1.83E-05	0.003041	0.002266	9.29E-05	0.003908	0.021395	0.022306	0.095674	0.007129	0.011164	0.012583	0.026485	0.032211	0.008066	0.000705	0.378214	0.621786	
33	1.89E-05	0.003126	0.00233	9.44E-05	0.004142	0.02181	0.022652	0.099222	0.007249	0.011353	0.012781	0.027549	0.032737	0.008203	0.000717	0.387304	0.612696	
34	1.94E-05	0.003209	0.002393	9.58E-05	0.004378	0.022212	0.022987	0.102714	0.007364	0.011535	0.012972	0.028599	0.033245	0.008336	0.000728	0.39619	0.60381	
35	1.99E-05	0.00329	0.002455	9.72E-05	0.004614	0.022601	0.023311	0.106151	0.007476	0.011711	0.013157	0.029635	0.033737	0.008464	0.000739	0.404877	0.595123	
36	2.04E-05	0.003369	0.002515	9.86E-05	0.004851	0.022979	0.023624	0.109531	0.007584	0.011881	0.013336	0.030655	0.034213	0.008588	0.00075	0.413372	0.586628	
37	2.08E-05	0.003447	0.002574	9.99E-05	0.005088	0.023346	0.023928	0.112855	0.007689	0.012046	0.01351	0.031661	0.034675	0.008708	0.000761	0.42168	0.57832	
38	2.13E-05	0.003523	0.002632	0.000101	0.005325	0.023701	0.024222	0.116123	0.00779	0.012206	0.013678	0.032651	0.035122	0.008825	0.000771	0.429808	0.570192	
39	2.18E-05	0.003598	0.002689	0.000102	0.005562	0.024047	0.024508	0.119336	0.007889	0.012362	0.013841	0.033626	0.035556	0.008938	0.00078	0.437761	0.562239	
40	2.22E-05	0.003671	0.002745	0.000104	0.005798	0.024382	0.024785	0.122495	0.007985	0.012512	0.013999	0.034586	0.035977	0.009048	0.00079	0.445544	0.554456	
41	2.27E-05	0.003743	0.0028	0.000105	0.006034	0.024709	0.025054	0.1256	0.008077	0.012659	0.014153	0.035531	0.036385	0.009154	0.000799	0.453162	0.546838	
42	2.31E-05	0.003814	0.002853	0.000106	0.006269	0.025026	0.025315	0.128651	0.008168	0.012801	0.014302	0.03646	0.036783	0.009258	0.000808	0.46062	0.53938	
43	2.35E-05	0.003882	0.002905	0.000107	0.006503	0.025335	0.02557	0.13165	0.008255	0.012939	0.014447	0.037375	0.037169	0.009358	0.000817	0.467922	0.532078	
44	2.4E-05	0.00395	0.002957	0.000108	0.006736	0.025636	0.025817	0.134597	0.008341	0.013074	0.014588	0.038274	0.037544	0.009456	0.000825	0.475074	0.524926	

Sheet1 Sheet2 Sheet4

Ready 100%


100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Percent Retained
Apr-00
Sep-05
Mar-11
Sep-16
Feb-22
Aug-27
Feb-33
Jul-38
Jan-44
Years since recharge



Book1 - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Developer

A63 4/20/1905

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
34	12/2/1902	0.000144	0.002317	5.99E-05	0.004482	4.03E-05	0.012008	0.04884	0.000798	0.029685	0.03356	1.42E-05	3.75E-05	4.27E-05	6.78E-06	0.000141	5.81E-07	0.0002
35	1/1/1903	0.000159	0.00235	6.16E-05	0.004552	4.09E-05	0.012246	0.049532	0.00081	0.030104	0.034034	1.45E-05	3.82E-05	4.35E-05	6.91E-06	0.000144	5.92E-07	0.0002
36	1/31/1903	0.000175	0.002382	6.34E-05	0.004619	4.16E-05	0.012478	0.050202	0.000821	0.030509	0.034494	1.47E-05	3.89E-05	4.43E-05	7.04E-06	0.000147	6.03E-07	0.000
37	3/2/1903	0.000192	0.002412	6.51E-05	0.004684	4.22E-05	0.012704	0.050851	0.000831	0.030902	0.034939	1.5E-05	3.96E-05	4.51E-05	7.16E-06	0.000149	6.13E-07	0.0002
38	4/1/1903	0.000209	0.002442	6.67E-05	0.004747	4.27E-05	0.012924	0.051481	0.000841	0.031283	0.03537	1.53E-05	4.02E-05	4.58E-05	7.28E-06	0.000152	6.23E-07	0.0002
39	5/1/1903	0.000227	0.002471	6.83E-05	0.004808	4.33E-05	0.013138	0.052091	0.000851	0.031653	0.035789	1.55E-05	4.09E-05	4.65E-05	7.4E-06	0.000154	6.33E-07	0.0002
40	5/31/1903	0.000247	0.002499	6.99E-05	0.004868	4.39E-05	0.013347	0.052684	0.000861	0.032011	0.036195	1.57E-05	4.15E-05	4.73E-05	7.51E-06	0.000156	6.43E-07	0.0002
41	6/30/1903	0.000266	0.002526	7.14E-05	0.004926	4.44E-05	0.013551	0.053259	0.00087	0.032359	0.03659	1.6E-05	4.21E-05	4.79E-05	7.62E-06	0.000159	6.52E-07	0.0002
42	7/30/1903	0.000287	0.002553	7.29E-05	0.004982	4.49E-05	0.01375	0.053818	0.000879	0.032698	0.036973	1.62E-05	4.27E-05	4.86E-05	7.73E-06	0.000161	6.62E-07	0.0002
43	8/29/1903	0.000308	0.002578	7.44E-05	0.005036	4.54E-05	0.013944	0.054362	0.000888	0.033027	0.037346	1.64E-05	4.33E-05	4.93E-05	7.83E-06	0.000163	6.7E-07	0.0002
44	9/28/1903	0.00033	0.002603	7.58E-05	0.005089	4.59E-05	0.014133	0.05489	0.000897	0.033347	0.037709	1.66E-05	4.38E-05	4.99E-05	7.93E-06	0.000165	6.79E-07	0.0002
45	10/28/1903	0.000353	0.002628	7.72E-05	0.005141	4.64E-05	0.014318	0.055405	0.000905	0.033658	0.038062	1.68E-05	4.44E-05	5.05E-05	8.03E-06	0.000167	6.88E-07	0.0002
46	11/27/1903	0.000377	0.002651	7.85E-05	0.005191	4.69E-05	0.014499	0.055905	0.000913	0.033961	0.038406	1.7E-05	4.49E-05	5.11E-05	8.13E-06	0.000169	6.96E-07	0.0002
47	12/27/1903	0.000401	0.002675	7.99E-05	0.00524	4.73E-05	0.014675	0.056393	0.000921	0.034257	0.03874	1.72E-05	4.54E-05	5.17E-05	8.22E-06	0.000171	7.04E-07	0.0002
48	1/26/1904	0.000426	0.002697	8.12E-05	0.005288	4.77E-05	0.014847	0.056868	0.000929	0.034544	0.039066	1.74E-05	4.59E-05	5.23E-05	8.32E-06	0.000173	7.12E-07	0.0002
49	2/25/1904	0.000452	0.002719	8.24E-05	0.005334	4.82E-05	0.015016	0.057331	0.000937	0.034824	0.039384	1.76E-05	4.64E-05	5.29E-05	8.41E-06	0.000175	7.19E-07	0.0002
50	3/26/1904	0.000478	0.00274	8.37E-05	0.00538	4.86E-05	0.01518	0.057782	0.000944	0.035098	0.039694	1.78E-05	4.69E-05	5.34E-05	8.49E-06	0.000177	7.27E-07	0.0003
51	4/25/1904	0.000505	0.002761	8.49E-05	0.005424	4.9E-05	0.015341	0.058223	0.000951	0.035364	0.039996	1.8E-05	4.74E-05	5.4E-05	8.58E-06	0.000179	7.34E-07	0.0003
52	5/25/1904	0.000533	0.002781	8.61E-05	0.005467	4.94E-05	0.015499	0.058652	0.000958	0.035624	0.040291	1.82E-05	4.79E-05	5.45E-05	8.66E-06	0.00018	7.41E-07	0.0003
53	6/24/1904	0.000561	0.002801	8.72E-05	0.005509	4.98E-05	0.015653	0.059071	0.000965	0.035878	0.040579	1.83E-05	4.83E-05	5.5E-05	8.74E-06	0.000182	7.48E-07	0.000
54	7/24/1904	0.00059	0.002821	8.84E-05	0.00555	5.02E-05	0.015803	0.05948	0.000972	0.036126	0.04086	1.85E-05	4.87E-05	5.55E-05	8.82E-06	0.000184	7.55E-07	0.0003
55	8/23/1904	0.000619	0.00284	8.95E-05	0.00559	5.05E-05	0.015951	0.05988	0.000978	0.036367	0.041134	1.87E-05	4.92E-05	5.6E-05	8.9E-06	0.000185	7.62E-07	0.0003
56	9/22/1904	0.000649	0.002858	9.06E-05	0.005629	5.09E-05	0.016095	0.06027	0.000985	0.036604	0.041402	1.88E-05	4.96E-05	5.65E-05	8.98E-06	0.000187	7.68E-07	0.0003
57	10/22/1904	0.000679	0.002876	9.17E-05	0.005667	5.13E-05	0.016236	0.060651	0.000991	0.036834	0.041664	1.9E-05	5E-05	5.69E-05	9.05E-06	0.000188	7.75E-07	0.0003
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61	2/19/1905	0.000806	0.002944	9.57E-05	0.005812	5.26E-05	0.016771	0.062092	0.001014	0.037707	0.042654	1.96E-05	5.16E-05	5.87E-05	9.33E-06	0.000194	7.99E-07	0.0003
62	3/21/1905	0.000839	0.00296	9.67E-05	0.005846	5.29E-05	0.016898	0.062432	0.00102	0.037913	0.042888	1.97E-05	5.19E-05	5.91E-05	9.4E-06	0.000196	8.04E-07	0.0003
63	4/20/1905	0.000872	0.002976	9.76E-05	0.005879	5.32E-05	0.017022	0.062765	0.001025	0.038114	0.043117	1.98E-05	5.23E-05	5.95E-05	9.46E-06	0.000197	8.1E-07	0.0003
64	5/20/1905	0.000906	0.002992	9.86E-05	0.005912	5.35E-05	0.017144	0.063091	0.001031	0.038312	0.043341	2E-05	5.26E-05	5.99E-05	9.53E-06	0.000198	8.15E-07	0.0003
65	6/19/1905	0.00094	0.003007	9.95E-05	0.005944	5.38E-05	0.017263	0.06341	0.001036	0.038505	0.04356	2.01E-05	5.3E-05	6.03E-05	9.59E-06	0.0002	8.21E-07	0.000
66	7/19/1905	0.000975	0.003021	0.0001	0.005975	5.41E-05	0.01738	0.063722	0.001041	0.038694	0.043775	2.02E-05	5.33E-05	6.07E-05	9.65E-06	0.000201	8.26E-07	0.0003
67	8/18/1905	0.00101	0.003036	0.000101	0.006006	5.44E-05	0.017494	0.064028	0.001046	0.038879	0.043985	2.04E-05	5.36E-05	6.11E-05	9.71E-06	0.000202	8.31E-07	0.0003
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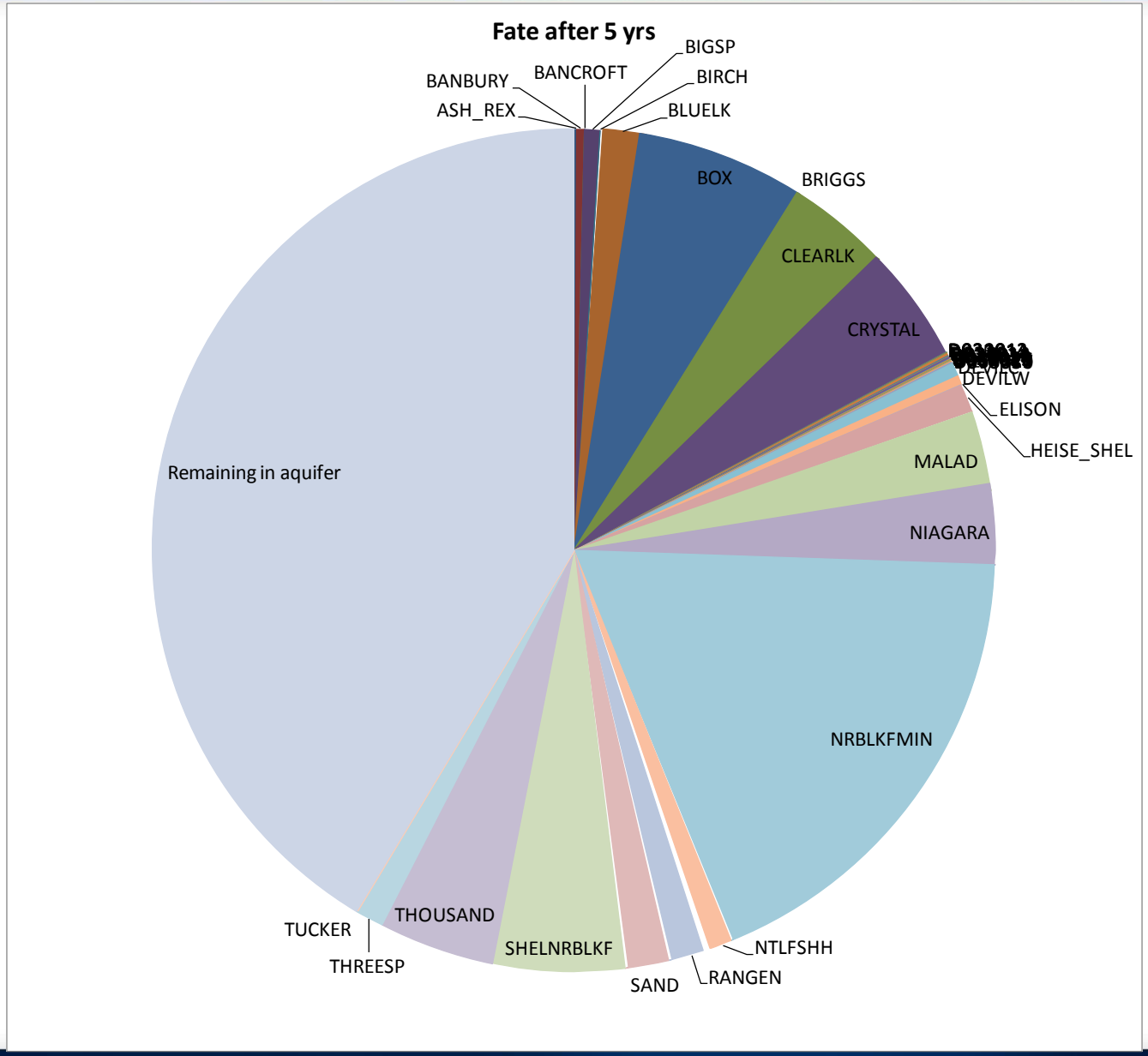
72	1/15/1906	0.00119	0.003104	0.000105	0.006149	5.57E-05	0.018033	0.065464	0.001069	0.039748	0.044972	2.09E-05	5.52E-05	6.28E-05	9.99E-06	0.000208	8.55E-07	0.0003
73	2/14/1906	0.001227	0.003117	0.000106	0.006176	5.6E-05	0.018134	0.065734	0.001074	0.039912	0.045158	2.11E-05	5.55E-05	6.32E-05	1E-05	0.000209	8.59E-07	0.0003
74	3/16/1906	0.001264	0.003129	0.000107	0.006203	5.62E-05	0.018234	0.065999	0.001078	0.040072	0.04534	2.12E-05	5.58E-05	6.35E-05	1.01E-05	0.00021	8.64E-07	0.0003
75	4/15/1906	0.001302	0.003141	0.000108	0.006229	5.65E-05	0.018331	0.066258	0.001082	0.040229	0.045518	2.13E-05	5.6E-05	6.38E-05	1.01E-05	0.000211	8.68E-07	0.000
76	5/15/1906	0.001339	0.003153	0.000108	0.006254	5.67E-05	0.018427	0.066512	0.001086	0.040383	0.045693	2.14E-05	5.63E-05	6.41E-05	1.02E-05	0.000212	8.72E-07	0.0003
77	6/14/1906	0.001378	0.003165	0.000109	0.006279	5.69E-05	0.01852	0.066761	0.00109	0.040534	0.045865	2.15E-05	5.66E-05	6.44E-05	1.02E-05	0.000213	8.76E-07	0.0003

Sheet2 Sheet1 Sheet3

Ready Average: 2/3/1900 Count: 57 Sum: 4/21/1905 100%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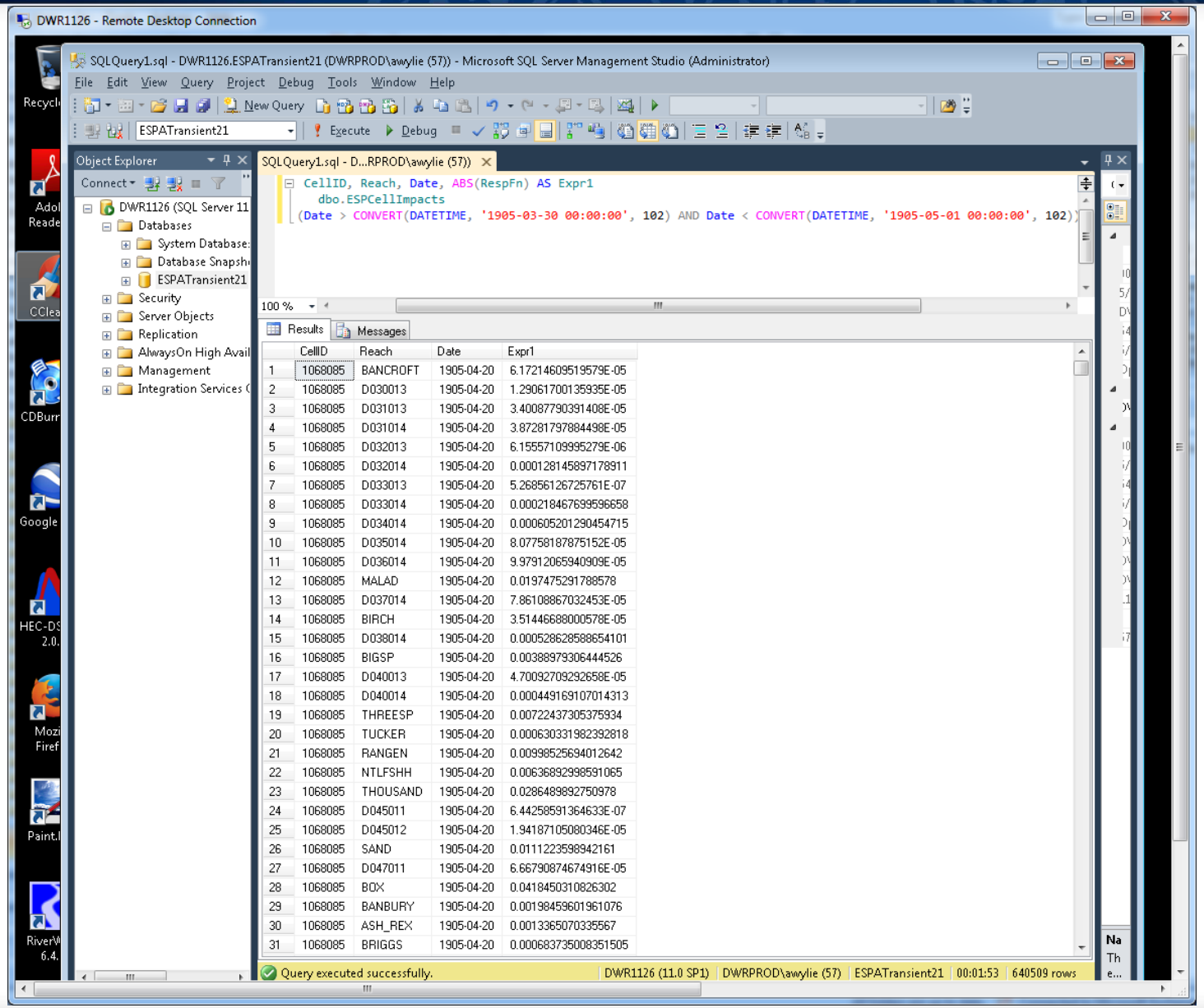
DWR1126 - Remote Desktop Connection
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File Edit View Query Project Debug Tools Window Help
New Query
ESPATransient21
Execute
Debug
Object Explorer
Connect
DWR1126 (SQL Server 11
Databases
System Database
Database Snapsh
ESPATransient21
Security
Server Objects
Replication
AlwaysOn High Avail
Management
Integration Services
SQLQuery1.sql - D...RPROD\awylie (57))
CellID, Reach, Date, ABS(RespFn) AS Expr1
dbo.ESPCellImpacts
(Date > CONVERT(DATETIME, '1905-03-30 00:00:00', 102) AND Date < CONVERT(DATETIME, '1905-05-01 00:00:00', 102))
100 %
Results
Messages
CellID Reach Date Expr1
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2 1068085 D030013 1905-04-20 1.29061700135935E-05
3 1068085 D031013 1905-04-20 3.40087790391408E-05
4 1068085 D031014 1905-04-20 3.87281797884498E-05
5 1068085 D032013 1905-04-20 6.15557109995279E-06
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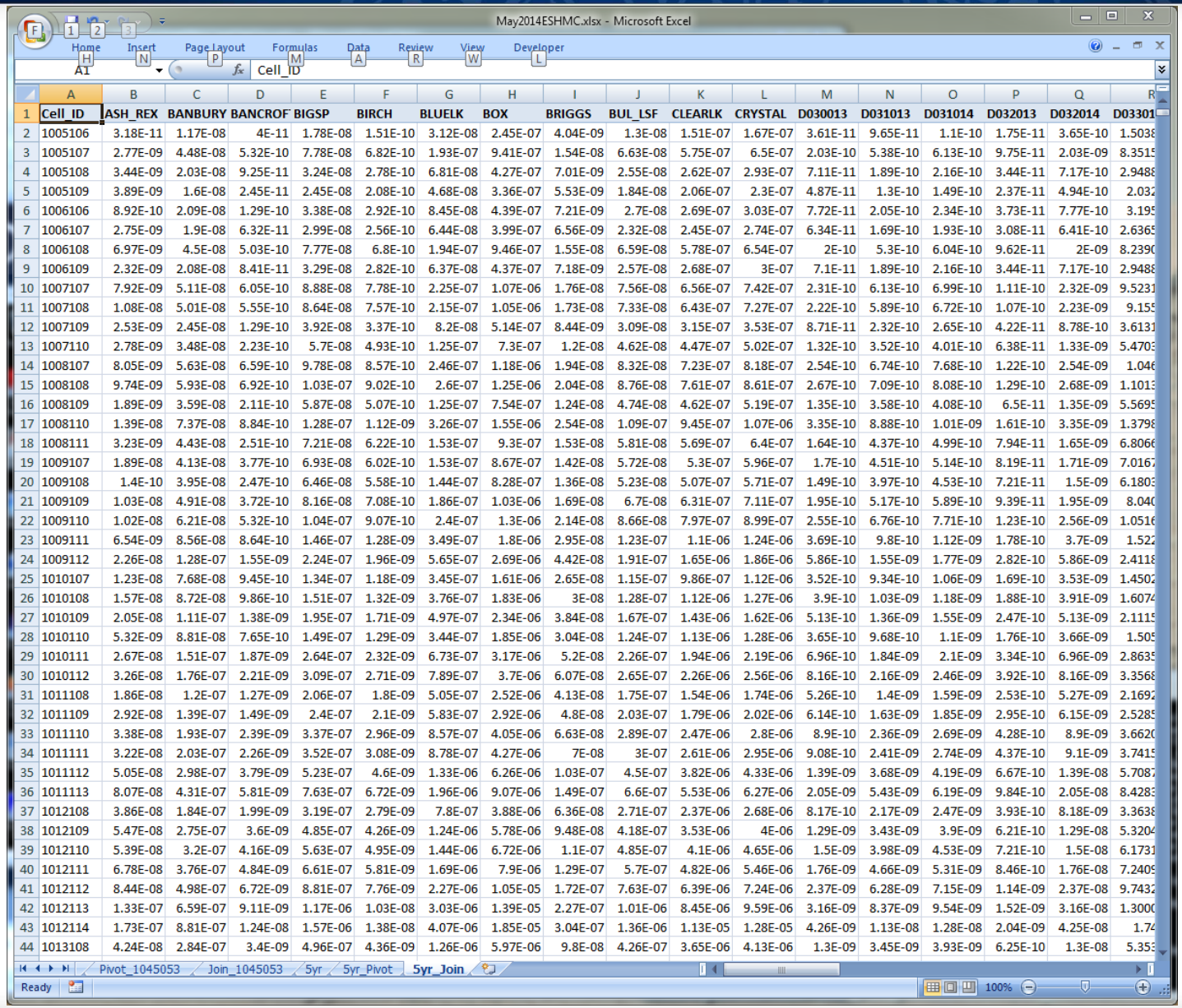
IDAHO Department of Water Resources



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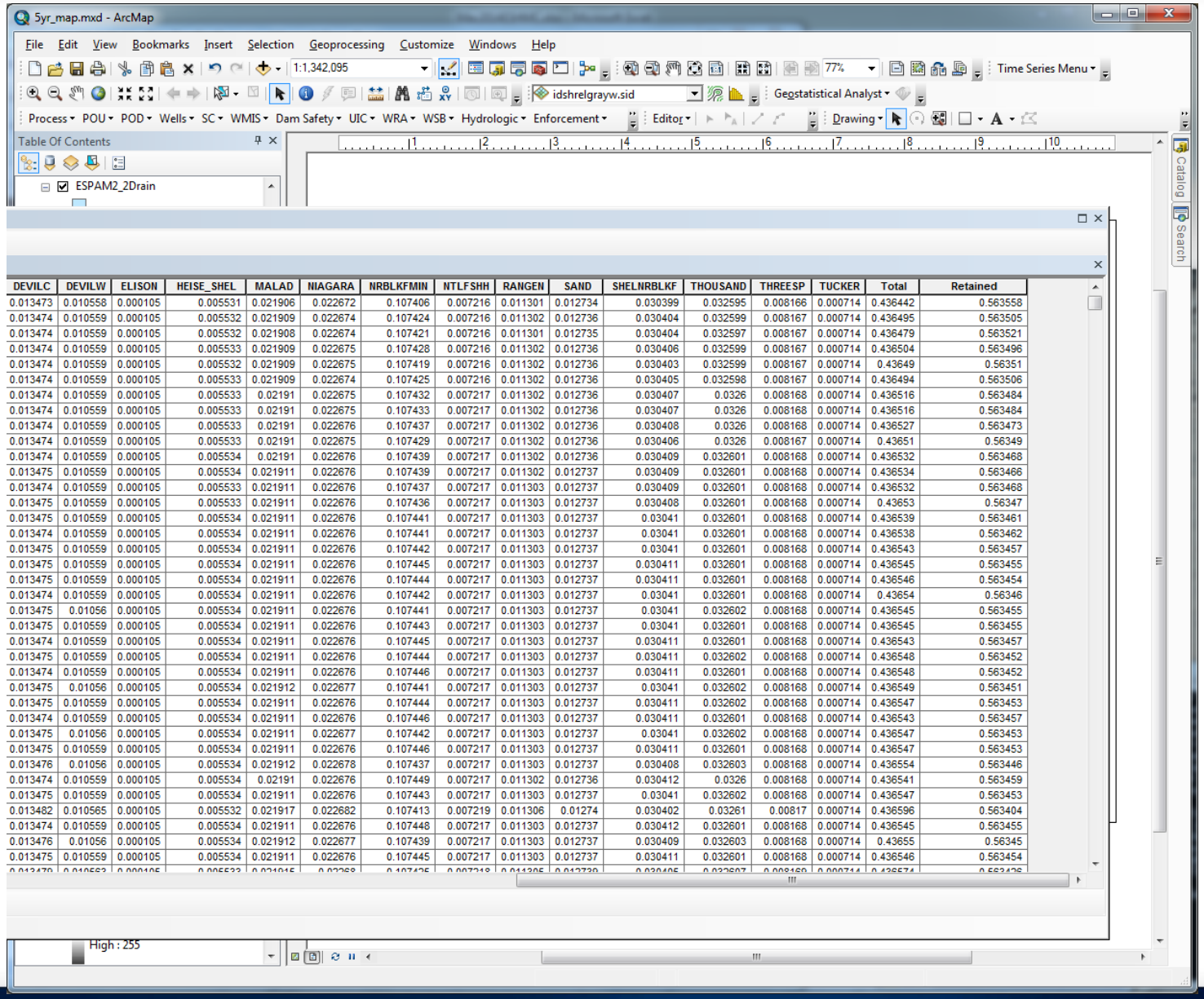
19	1009107	1.89E-08	4.13E-08	3.77E-10	6.93E-08	6.02E-10	1.53E-07	8.67E-07	1.42E-08	5.72E-08	5.3E-07	5.96E-07	1.7E-10	4.51E-10	5.14E-10	8.19E-11	1.71E-09	7.0167
20	1009108	1.4E-10	3.95E-08	2.47E-10	6.46E-08	5.58E-10	1.44E-07	8.28E-07	1.36E-08	5.23E-08	5.07E-07	5.71E-07	1.49E-10	3.97E-10	4.53E-10	7.21E-11	1.5E-09	6.1803
21	1009109	1.03E-08	4.91E-08	3.72E-10	8.16E-08	7.08E-10	1.86E-07	1.03E-06	1.69E-08	6.7E-08	6.31E-07	7.11E-07	1.95E-10	5.17E-10	5.89E-10	9.39E-11	1.95E-09	8.040
22	1009110	1.02E-08	6.21E-08	5.32E-10	1.04E-07	9.07E-10	2.4E-07	1.3E-06	2.14E-08	8.66E-08	7.97E-07	8.99E-07	2.55E-10	6.76E-10	7.71E-10	1.23E-10	2.56E-09	1.0516
23	1009111	6.54E-09	8.56E-08	8.64E-10	1.46E-07	1.28E-09	3.49E-07	1.8E-06	2.95E-08	1.23E-07	1.1E-06	1.24E-06	3.69E-10	9.8E-10	1.12E-09	1.78E-10	3.7E-09	1.522
24	1009112	2.26E-08	1.28E-07	1.55E-09	2.24E-07	1.96E-09	5.65E-07	2.69E-06	4.42E-08	1.91E-07	1.65E-06	1.86E-06	5.86E-10	1.55E-09	1.77E-09	2.82E-10	5.86E-09	2.4118
25	1010107	1.23E-08	7.68E-08	9.45E-10	1.34E-07	1.18E-09	3.45E-07	1.61E-06	2.65E-08	1.15E-07	9.86E-07	1.12E-06	3.52E-10	9.34E-10	1.06E-09	1.69E-10	3.53E-09	1.4502
26	1010108	1.57E-08	8.72E-08	9.86E-10	1.51E-07	1.32E-09	3.76E-07	1.83E-06	3E-08	1.28E-07	1.12E-06	1.27E-06	3.9E-10	1.03E-09	1.18E-09	1.88E-10	3.91E-09	1.6074
27	1010109	2.05E-08	1.11E-07	1.38E-09	1.95E-07	1.71E-09	4.97E-07	2.34E-06	3.84E-08	1.67E-07	1.43E-06	1.62E-06	5.13E-10	1.36E-09	1.55E-09	2.47E-10	5.13E-09	2.1115
28	1010110	5.32E-09	8.81E-08	7.65E-10	1.49E-07	1.29E-09	3.44E-07	1.85E-06	3.04E-08	1.24E-07	1.13E-06	1.28E-06	3.65E-10	9.68E-10	1.1E-09	1.76E-10	3.66E-09	1.505
29	1010111	2.67E-08	1.51E-07	1.87E-09	2.64E-07	2.32E-09	6.73E-07	3.17E-06	5.2E-08	2.26E-07	1.94E-06	2.19E-06	6.96E-10	1.84E-09	2.1E-09	3.34E-10	6.96E-09	2.8635
30	1010112	3.26E-08	1.76E-07	2.21E-09	3.09E-07	2.71E-09	7.89E-07	3.7E-06	6.07E-08	2.65E-07	2.26E-06	2.56E-06	8.16E-10	2.16E-09	2.46E-09	3.92E-10	8.16E-09	3.3568
31	1011108	1.86E-08	1.2E-07	1.27E-09	2.06E-07	1.8E-09	5.05E-07	2.52E-06	4.13E-08	1.75E-07	1.54E-06	1.74E-06	5.26E-10	1.4E-09	1.59E-09	2.53E-10	5.27E-09	2.1692
32	1011109	2.92E-08	1.39E-07	1.49E-09	2.4E-07	2.1E-09	5.83E-07	2.92E-06	4.8E-08	2.03E-07	1.79E-06	2.02E-06	6.14E-10	1.63E-09	1.85E-09	2.95E-10	6.15E-09	2.5285
33	1011110	3.38E-08	1.93E-07	2.39E-09	3.37E-07	2.96E-09	8.57E-07	4.05E-06	6.63E-08	2.89E-07	2.47E-06	2.8E-06	8.9E-10	2.36E-09	2.69E-09	4.28E-10	8.9E-09	3.6620
34	1011111	3.22E-08	2.03E-07	2.26E-09	3.52E-07	3.08E-09	8.78E-07	4.27E-06	7E-08	3E-07	2.61E-06	2.95E-06	9.08E-10	2.41E-09	2.74E-09	4.37E-10	9.1E-09	3.7415
35	1011112	5.05E-08	2.98E-07	3.79E-09	5.23E-07	4.6E-09	1.33E-06	6.26E-06	1.03E-07	4.5E-07	3.82E-06	4.33E-06	1.39E-09	3.68E-09	4.19E-09	6.67E-10	1.39E-08	5.7087
36	1011113	8.07E-08	4.31E-07	5.81E-09	7.63E-07	6.72E-09	1.96E-06	9.07E-06	1.49E-07	6.6E-07	5.53E-06	6.27E-06	2.05E-09	5.43E-09	6.19E-09	9.84E-10	2.05E-08	8.4283
37	1012108	3.86E-08	1.84E-07	1.99E-09	3.19E-07	2.79E-09	7.8E-07	3.88E-06	6.36E-08	2.71E-07	2.37E-06	2.68E-06	8.17E-10	2.17E-09	2.47E-09	3.93E-10	8.18E-09	3.3638
38	1012109	5.47E-08	2.75E-07	3.6E-09	4.85E-07	4.26E-09	1.24E-06	5.78E-06	9.48E-08	4.18E-07	3.53E-06	4E-06	1.29E-09	3.43E-09	3.9E-09	6.21E-10	1.29E-08	5.3204
39	1012110	5.39E-08	3.2E-07	4.16E-09	5.63E-07	4.95E-09	1.44E-06	6.72E-06	1.1E-07	4.85E-07	4.1E-06	4.65E-06	1.5E-09	3.98E-09	4.53E-09	7.21E-10	1.5E-08	6.1731
40	1012111	6.78E-08	3.76E-07	4.84E-09	6.61E-07	5.81E-09	1.69E-06	7.9E-06	1.29E-07	5.7E-07	4.82E-06	5.46E-06	1.76E-09	4.66E-09	5.31E-09	8.46E-10	1.76E-08	7.2409
41	1012112	8.44E-08	4.98E-07	6.72E-09	8.81E-07	7.76E-09	2.27E-06	1.05E-05	1.72E-07	7.63E-07	6.39E-06	7.24E-06	2.37E-09	6.28E-09	7.15E-09	1.14E-09	2.37E-08	9.7432
42	1012113	1.33E-07	6.59E-07	9.11E-09	1.17E-06	1.03E-08	3.03E-06	1.39E-05	2.27E-07	1.01E-06	8.45E-06	9.59E-06	3.16E-09	8.37E-09	9.54E-09	1.52E-09	3.16E-08	1.3000
43	1012114	1.73E-07	8.81E-07	1.24E-08	1.57E-06	1.38E-08	4.07E-06	1.85E-05	3.04E-07	1.36E-06	1.13E-05	1.28E-05	4.26E-09	1.13E-08	1.28E-08	2.04E-09	4.25E-08	1.74
44	1013108	4.24E-08	2.84E-07	3.4E-09	4.96E-07	4.36E-09	1.26E-06	5.97E-06	9.8E-08	4.26E-07	3.65E-06	4.13E-06	1.3E-09	3.45E-09	3.93E-09	6.25E-10	1.3E-08	5.353



DEVILC	DEVILW	ELISON	HEISE_SHEL	MALAD	NIAGARA	NRBLKFMIN	NTLFSHH	RANGEN	SAND	SHELNRBLKF	THOUSAND	THREESP	TUCKER	Total	Retained
0.013473	0.010558	0.000105	0.005531	0.021906	0.022672	0.107406	0.007216	0.011301	0.012734	0.030399	0.032595	0.008166	0.000714	0.436442	0.563558
0.013474	0.010559	0.000105	0.005532	0.021909	0.022674	0.107424	0.007216	0.011302	0.012736	0.030404	0.032599	0.008167	0.000714	0.436495	0.563505
0.013474	0.010559	0.000105	0.005532	0.021908	0.022674	0.107421	0.007216	0.011301	0.012735	0.030404	0.032597	0.008167	0.000714	0.436479	0.563521
0.013474	0.010559	0.000105	0.005533	0.021909	0.022675	0.107428	0.007216	0.011302	0.012736	0.030406	0.032599	0.008167	0.000714	0.436504	0.563496
0.013474	0.010559	0.000105	0.005532	0.021909	0.022675	0.107419	0.007216	0.011302	0.012736	0.030403	0.032599	0.008167	0.000714	0.43649	0.56351
0.013474	0.010559	0.000105	0.005533	0.021909	0.022674	0.107425	0.007216	0.011302	0.012736	0.030405	0.032598	0.008167	0.000714	0.436494	0.563506
0.013474	0.010559	0.000105	0.005533	0.02191	0.022675	0.107432	0.007217	0.011302	0.012736	0.030407	0.0326	0.008168	0.000714	0.436516	0.563484
0.013474	0.010559	0.000105	0.005533	0.02191	0.022675	0.107433	0.007217	0.011302	0.012736	0.030407	0.0326	0.008168	0.000714	0.436516	0.563484
0.013474	0.010559	0.000105	0.005533	0.02191	0.022676	0.107437	0.007217	0.011302	0.012736	0.030408	0.0326	0.008168	0.000714	0.436527	0.563473
0.013474	0.010559	0.000105	0.005533	0.02191	0.022675	0.107429	0.007217	0.011302	0.012736	0.030406	0.0326	0.008167	0.000714	0.43651	0.56349
0.013474	0.010559	0.000105	0.005534	0.02191	0.022676	0.107439	0.007217	0.011302	0.012736	0.030409	0.032601	0.008168	0.000714	0.436532	0.563468
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107439	0.007217	0.011302	0.012737	0.030409	0.032601	0.008168	0.000714	0.436534	0.563466
0.013474	0.010559	0.000105	0.005533	0.021911	0.022676	0.107437	0.007217	0.011303	0.012737	0.030409	0.032601	0.008168	0.000714	0.436532	0.563468
0.013475	0.010559	0.000105	0.005533	0.021911	0.022676	0.107436	0.007217	0.011303	0.012737	0.030408	0.032601	0.008168	0.000714	0.43653	0.56347
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107441	0.007217	0.011303	0.012737	0.03041	0.032601	0.008168	0.000714	0.436539	0.563461
0.013474	0.010559	0.000105	0.005534	0.021911	0.022676	0.107441	0.007217	0.011303	0.012737	0.03041	0.032601	0.008168	0.000714	0.436538	0.563462
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107442	0.007217	0.011303	0.012737	0.03041	0.032601	0.008168	0.000714	0.436543	0.563457
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107445	0.007217	0.011303	0.012737	0.030411	0.032601	0.008168	0.000714	0.436545	0.563455
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107444	0.007217	0.011303	0.012737	0.030411	0.032601	0.008168	0.000714	0.436546	0.563454
0.013474	0.010559	0.000105	0.005534	0.021911	0.022676	0.107442	0.007217	0.011303	0.012737	0.03041	0.032601	0.008168	0.000714	0.43654	0.56346
0.013475	0.01056	0.000105	0.005534	0.021911	0.022676	0.107441	0.007217	0.011303	0.012737	0.03041	0.032602	0.008168	0.000714	0.436545	0.563455
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107443	0.007217	0.011303	0.012737	0.03041	0.032601	0.008168	0.000714	0.436545	0.563455
0.013474	0.010559	0.000105	0.005534	0.021911	0.022676	0.107445	0.007217	0.011303	0.012737	0.030411	0.032601	0.008168	0.000714	0.436543	0.563457
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107444	0.007217	0.011303	0.012737	0.030411	0.032602	0.008168	0.000714	0.436548	0.563452
0.013474	0.010559	0.000105	0.005534	0.021911	0.022676	0.107446	0.007217	0.011303	0.012737	0.030411	0.032601	0.008168	0.000714	0.436548	0.563452
0.013475	0.01056	0.000105	0.005534	0.021912	0.022677	0.107441	0.007217	0.011303	0.012737	0.03041	0.032602	0.008168	0.000714	0.436549	0.563451
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107444	0.007217	0.011303	0.012737	0.030411	0.032602	0.008168	0.000714	0.436547	0.563453
0.013474	0.010559	0.000105	0.005534	0.021911	0.022676	0.107446	0.007217	0.011303	0.012737	0.030411	0.032601	0.008168	0.000714	0.436543	0.563457
0.013475	0.01056	0.000105	0.005534	0.021911	0.022677	0.107442	0.007217	0.011303	0.012737	0.03041	0.032602	0.008168	0.000714	0.436547	0.563453
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107446	0.007217	0.011303	0.012737	0.030411	0.032601	0.008168	0.000714	0.436547	0.563453
0.013476	0.01056	0.000105	0.005534	0.021912	0.022678	0.107437	0.007217	0.011303	0.012737	0.030408	0.032603	0.008168	0.000714	0.436554	0.563446
0.013474	0.010559	0.000105	0.005534	0.02191	0.022676	0.107449	0.007217	0.011302	0.012736	0.030412	0.0326	0.008168	0.000714	0.436541	0.563459
0.013475	0.010559	0.000105	0.005534	0.021911	0.022676	0.107443	0.007217	0.011303	0.012737	0.03041	0.032602	0.008168	0.000714	0.436547	0.563453
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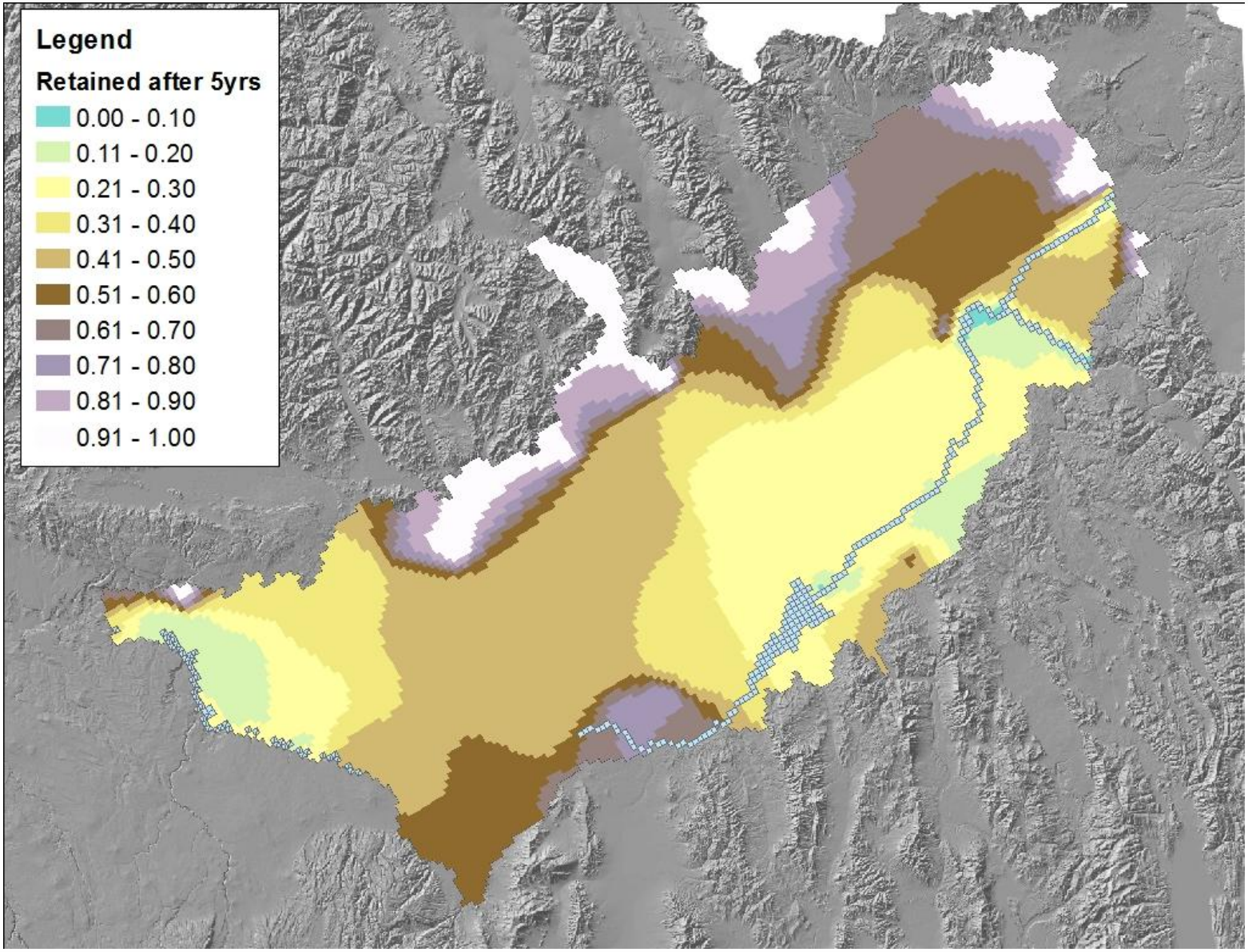
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Retained after 5yrs
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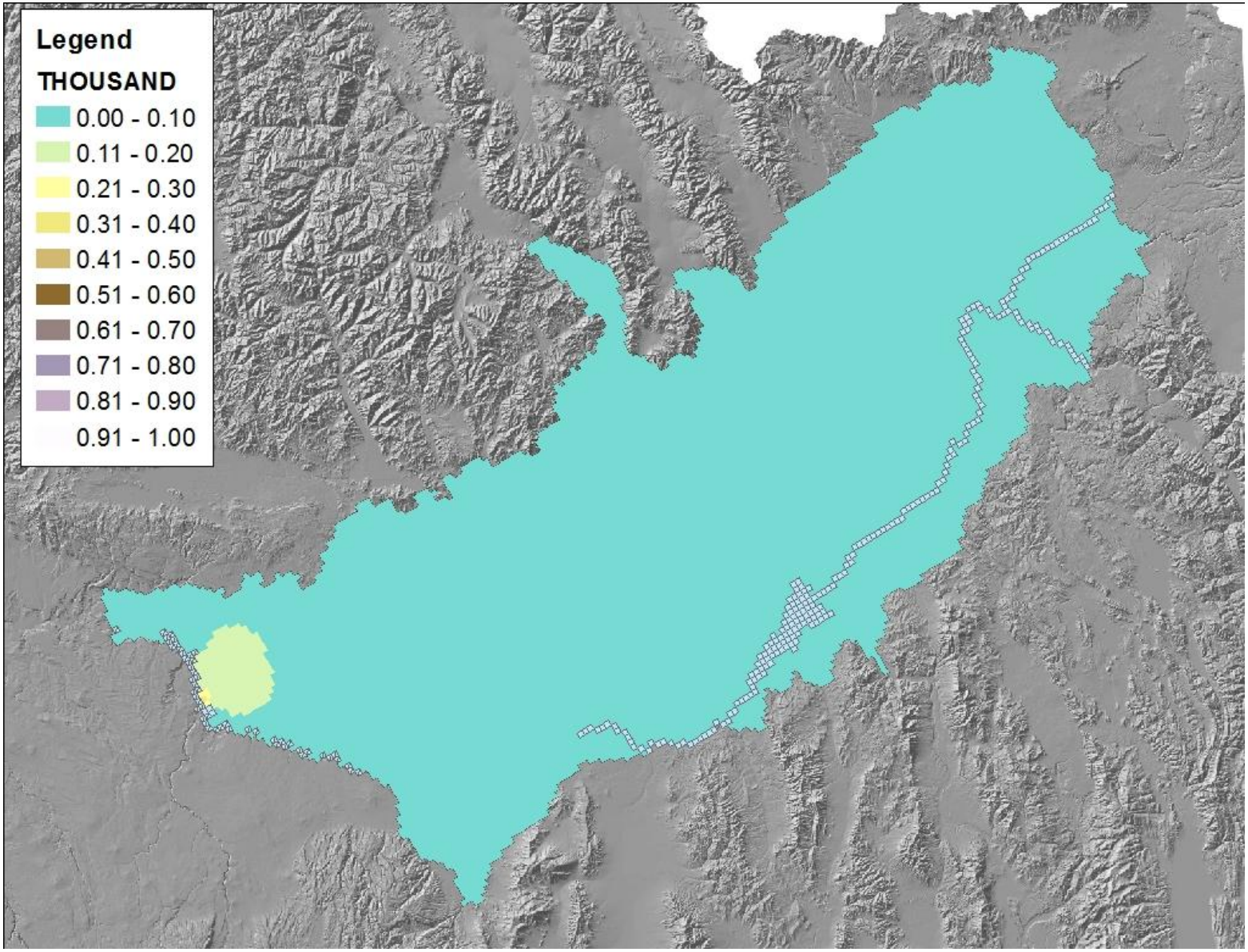
0.21 - 0.30
0.31 - 0.40
0.41 - 0.50
0.51 - 0.60
0.61 - 0.70
0.71 - 0.80
0.81 - 0.90
0.91 - 1.00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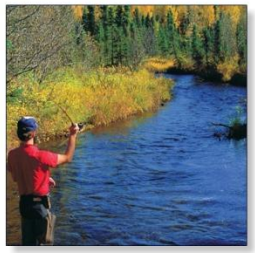
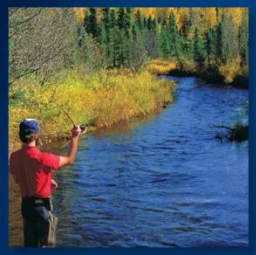


Summary

- Database of transient depletion factors
  - 30 day injection of 1.2 cfs
  - 40 yr of no injection
- Available on ESHMC web page
  - 799 MB in zipped text files
  - 12.2 GB in SQL database
- Produce
  - Aquifer retention curves
  - Pie charts illustrating
    - » Remaining in aquifer at specific date
    - » Where primary exit point is
  - Maps showing depletion factors at a specific date

IDAHO Department of Water Resources



End